



DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS NORTH ATLANTIC DIVISION
FORT HAMILTON MILITARY COMMUNITY
302 GENERAL LEE AVENUE
BROOKLYN NY 11252-6700

DEC 9 2016

CENAD-RB-T

MEMORANDUM FOR Commander, Philadelphia District, 100 Penn Square East,
Philadelphia, Pennsylvania 19107-3390 (CENAP-PD-OP/Mr. Robert Phillips)

SUBJECT: Approval of the Review Plan for the Bethlehem Levee, Fahy Bridge
Rehabilitation, Section 408.

1. References:

a. Memorandum, CENAP-EC, 22 August 2016, subject: Review Plan for Bethlehem
Levee, Fahy Bridge Rehabilitation, Section 408

b. EC 1165-2-216, Policy and Procedural Guidance for Processing Request to Alter
US Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408, 31 July
2014

c. EC 1165-2-214, Civil Works Review Policy, 15 December 2015

2. The enclosed Review Plan for the Fahy Bridge Rehabilitation was prepared in
accordance with Reference 1c. The project includes the rehabilitation of the ten span
steel Fahy Street Bridge, including the replacement of two pedestrian staircases and
construction of three pedestrian alcoves one of which is on top of the Bethlehem Levee.
This alcove will be supported by a caisson which extends through the levee.

3. The Risk Management Center is the Review Management Organization for this
project. The ATR will be managed by the Philadelphia District. The Review Plan
includes Type II Independent External Peer Review (EIPR) (Safety Assurance Review)
for the work impacting the Bethlehem Levee.

4. The Review Plan for the Bethlehem Levee, Fahy Bridge Rehabilitation, Section 408
is approved. The Review Plan is subject to change as circumstances require,
consistent with project development under the Project Management Business Process.
Subsequent revisions to this Review Plan require new written approval from this office.

5. In accordance with Reference 1c, Appendix B, Paragraph 6, post this approved
Review Plan on your district website for public review and comment. The Review Plan
will also be posted on the Division website.

CENAD-RB-T

SUBJECT: Approval of the Review Plan for the Bethlehem Levee, Fahy Bridge
Rehabilitation, Section 408

6. The point of contact is Ralph LaMoglia, PE, Hydraulic Engineer, 347-370-4599,
ralph.lamoglia.civ@mail.mil

A handwritten signature in black ink, appearing to read "W. H. Graham", with a long horizontal line extending to the right.

WILLIAM H. GRAHAM
Brigadier General, USA
Commanding

Encl
as

CF:
CENAP-EC-EG (Mr. Robert Phillips)



DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
WANAMAKER BUILDING, 100 PENN SQUARE EAST
PHILADELPHIA, PENNSYLVANIA 19107-3390

AUG 22 2016

CENAP-EC

MEMORANDUM FOR CENAD-PD-OP

SUBJECT: Review Plan for Bethlehem Levee, Fahy Bridge Rehabilitation, Section 408 Request

1. Respectfully request that the attached review plan be approved for a Section 408 Review regarding the proposed modification of the Bethlehem Levee for the Fahy Bridge Rehabilitation pursuant to 33 USC 408.
2. This Review Plan was developed from an examination of the nature and scope in accordance with the requirements set forth in the Civil Works Review Policy (EC 1165-2-214) and EC 1165-2-216 "Policy and Procedural Guidance for Processing Requests to Alter US Army Corps of Engineers Civil Works Project Pursuant to 33 USC 408", dated 15 December 2012 and 31 July 2014 respectively. For this project, a Type II IEPR will be performed.
3. The Risk Management Center (RMC) reviewed the Review Plan and has provided an endorsement letter, which is enclosed.
4. Should you have any questions or concerns regarding this review plan, please contact the District Section 408 Coordinator, Robert Phillips, P.E. at 215-656-6682 or robert.w.phillips@usace.army.mil.

MICHAEL A. BLISS
LTC, EN
Commanding

2 Encls

1. Review Plan
2. RMC letter of Endorsement

Revised EC 10/20/2016

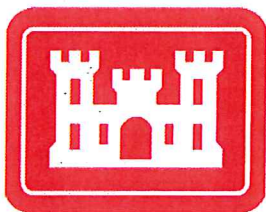
Review Plan
U.S. Army Corps of Engineers
North Atlantic Division
Philadelphia District

Bethlehem Levee
Fahy Bridge Rehabilitation

Pursuant to 33 USC § 408

MSC Approval Date: Pending

Last Revision Date: 29-July 2016



**US Army Corps
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Philadelphia District

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1. Purpose and Requirements

a. Purpose

This Review Plan is intended to ensure a quality-engineering project is developed by the Corps of Engineers. This Review Plan has been developed for the Fahy Bridge Rehabilitation. This Review Plan was prepared in accordance with EC 1165-2-214, "Civil Works Review Policy". The Review Plan shall layout a value added process that assures the correctness of the information shown. The purpose of the Review Plan is to determine if work proposed by HNTB Corporation is harmful or detrimental to the USACE project, or injurious to the public interest.

b. Guidance and Policy References

- EC 1165-2-214, Civil Works Review Policy, 15 December 2012
- ER 1110-1-12, Quality Management, 31 Mar 2011
- ER 1110-2-1156, Safety of Dams – Policy and Procedure, 31 Mar 2014
- EC 1165-2-216, Policy and Procedural Guidance for Processing Requests to Alter US Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408, 31 July 2014
- ER 1105-2-100, Planning Guidance Notebook, 22 April 2000
- ER 1110-1-1807, Drilling in Earth Embankment Dams and Levees, 31 December 2014
- EM 1110-2-1913 Design, Construction, and Evaluation of Levees, 30 April 2000
- MSC and/or District Quality Management Plan(s)
- 2015 Bethlehem Levee Periodic Inspection

c. Requirements

This Review Plan has been developed specifically for the Fahy Bridge Rehabilitation to ensure a quality-engineering evaluation. The Review Plan was developed in accordance with Policy and Procedural Guidance for Processing Requests to Alter US Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408 (EC 1165-2-216), dated 31 July 2014 and Civil Works Review Policy (EC 1165-2-214) dated 15 December 2012.

EC 1165-2-216 provides guidance for processing requests by private, public and other federal entities to temporarily occupy or use, any US Army Corps of Engineers (USACE) federally authorized civil works project pursuant to 33 USC 408. Proposed projects must not be injurious to the public interest or affect the USACE project's ability to meet its authorized purpose.

EC 1165-2-214, establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R). The EC outlines four general levels of review: Requestor Quality Control/Quality Assurance (RQC), Agency Technical Review (ATR), and Policy and Legal Compliance Review. The RP identifies the most important skill sets needed in the reviews and the objective of the review and the specific advice sought, thus setting the appropriate scale and scope of review for the individual project. This Review Plan should be provided to RQC, and ATR Review Management Organization

Drilling Program Plans must be reviewed and approved by the District Dam Safety Officer (Dams) or Levee Safety Officer (Levees). If any drilling fluid or other stabilizing or circulating media is proposed, a technical review performed by the Geotechnical and Materials Community of Practice (G&M CoP) Standing Committee on Drilling and Instrumentation is required. The plan will then require approval from the District DSO/LSO pending satisfactory resolution of the technical review comments, see ER 1110-1-1807. The Risk Management Center (RMC) is the Review Management Organization (RMO) for this project. Contents of this review plan have been coordinated with the RMC and the North Atlantic Division, the Major Subordinate Command (MSC). In-Progress Review (IPR) team meetings with NAD, and the project requestor will be scheduled on an "as needed" basis to discuss programmatic, policy, and technical matters. The Philadelphia District Section 408 Coordinator will be the POC for vertical team coordination. This review plan will be updated for each new project phase. Philadelphia District will assist the RMC with management of the ATR and IEPR review and development of the draft ATR and IEPR "charges".

2. Project Description and Information

a. Project Description

The City of Bethlehem is located in Lehigh and Northampton Counties in east-central Pennsylvania. Bethlehem is situated along the Lehigh River 11 miles upstream of the Lehigh-Delaware River confluence, and is 56 miles northwest of Philadelphia and 6 miles east of Allentown. Flood risk reduction is provided along the south (right) bank of the Lehigh River.

The Bethlehem, Pennsylvania flood risk reduction project was constructed under and authorized by the Flood Control Act approved of 24 July 1946, Public Law Number 526, 79th Congress, Second Session. The project adopted in this Act is substantially in accordance with the recommendation of the Chief of Engineers as presented in House

document Number 587, 79th Congress, Second Session. The Bethlehem Flood Damage Reduction System was completed in 1964 by USACE. The responsibility for the operation and maintenance of the Bethlehem Flood Risk Reduction System is with the City of Bethlehem.

The Bethlehem Project provides flood risk reduction along the right bank of the Lehigh River between the Hill-to-Hill Bridge and the Minsi Trail Bridge against flooding from the Lehigh River, while disposing of storm-water runoff and local industrial process water. The major components of the project are levees, floodwall and closure structures, pumping stations and conduit systems. The area protected on the right bank encompasses industrial and commercial property which consists principally of highly concentrated development of the Bethlehem plant of the Bethlehem Steel Company. The Lehigh Valley Railroad Station is at the upstream end of the area to be protected on the right bank. According to the Operations and Maintenance (O&M) manual, the flood barrier consists of a levee 7,121 feet long, concrete walls 723 feet long, closure structures (one at each end) totaling 207 feet, and tied to existing bridge piers and the concrete wall atop the Bethlehem Steel Company water intake.

Type of Barrier Approximate Length (feet)

Levee 7,121
Flood Walls 260
Portable closure structure – West 144
Portable closure structure – East 63
Monoliths 148
Pumping station walls 315
Existing bridge piers 138

The current status of the project is Unacceptable in the Inspection of Completed Works (ICW) Program. The main reasons for the Unacceptable status is the inoperability of the Pumping Stations as well as the unreliability of the closure structures at the upstream and downstream ends of the project.

b. Project Purpose

The authorized project purpose for the project is flood risk reduction.

c. Proposed Modification

The Pennsylvania Department of Transportation and HNTB Corporation have proposed to rehabilitate the Fahy Memorial Bridge. The project includes the rehabilitation of this ten-span steel I-beam and steel rigid frame structure which carries SR 3011 (New Street) over the Lehigh Valley Railroad, Norfolk Southern Railroad,



Lehigh River, Sand Island Park, Monocacy Creek the D&L Canal and the Bethlehem Floodworks project.

Features of the proposed rehabilitation include the following:

- a. Complete replacement of the existing bridge deck, sidewalks, barriers and railings
- b. Replacement of existing cobra head lights
- c. Replacement of the two staircases (Sand Island Park and E. 2nd Street)
- d. Filling in of the pedestrian tunnel connecting E 3rd St. to E. 2nd Street and construction of a ramp from the intersection of E. 3rd and Main Street onto the bridge.
- e. Removal of slip lanes leading onto the bridge from W. Lehigh Street and off of the bridge to Center Street; including improvements to existing signals.
- f. Construction of three alcove structures for pedestrian use attached to the structure at both replacement staircases and between the Lehigh River and Lehigh Railway (on top of the Bethlehem Levee)

The purpose of the project is to continue to provide a safe and effective crossing over the Norfolk Southern Railroad and Lehigh River for pedestrians, bicyclists and motorists in order to connect The Central Bethlehem and South Bethlehem Historic Districts and provide additional access to Sand Island Park. The bridge is used heavily by pedestrians, professional and recreational bicyclists to traverse between the historic downtown which contains Moravian College, attractions and shops as well as city hall and South Bethlehem which houses Lehigh University and additional attractions including the Sands Casino. The bridge also serves as an access point from both north and south to the Sand Island Park which contains a variety of recreational opportunities.

As proposed, Alcove 2 is to be supported by a caisson which extends through the levee. Risks associated with this modification can be found in Attachment 3.

d. Project Sponsor

The City of Bethlehem is the project requestor as well as the levee sponsor for the Bethlehem Levee. Bethlehem has endorsed the project in writing. HNTB Corporation is acting as the AE firm for the bridge repair on behalf of PennDot.

3. Level of Review Required by the Requester

a. Requestor Quality Control (RQC) Requirements

All implementation documents that affect the Governments levee (including supporting data, analyses, environmental compliance documents, etc.) shall undergo RQC. A RQC is an internal review process of basic science and engineering work products

focused on fulfilling the project quality requirements. The project requestor shall manage the RQC. Documentation of RQC activities is required and should be available at the request of the ATR team. Quality checks may be performed by staff responsible for the work, such as supervisors, work leaders, team leaders, designated individuals from the senior staff, or other qualified personnel. However, they should not be performed by the same people who performed the original work, including managing/reviewing the work in the case of contracted efforts. Quality Checks include a review of the alternatives considered, schedules, budgets, means and methods of construction, and have lessons learned been considered. RQC is assuring the math and assumptions are correct by having a checker initial each sheet of the computations. Additionally, the PDT is responsible to ensure consistency and effective coordination across all project disciplines during project design and construction management.

- b. Safety Assurance Review (SAR) A Safety Assurance Review, also known as a Type II IEPR, shall be conducted on design and construction activities for flood risk management projects, as well as, other projects where potential hazards pose a significant threat to human life. External panels will review the design and construction activities prior to initiation of physical construction and periodically thereafter until construction activities are completed. The charges to the SAR panels complement the ATR process and do not duplicate it, the SAR will be accomplished by the requestor. A SAR is to be provided by an A/E firm contracted by the requestor or arranged with another government agency to manage external to USACE. For a SAR, the selection of the review panel members will use the National Academy of Science (NAS) Policy which sets the standard for "independence" in the review process. The Requester's Design of Record AE CANNOT procure the experts. A site visit will be scheduled for the SAR Team.

4. Level of Review Required by the District

a. District Review Purpose

The review of all work products will be in accordance with the guidelines established within this review plan. The purpose of this review is to ensure the proper application of established criteria, regulations, laws, codes, principles and professional practices.

For the purposes of Section 408, the ATR team will make the following determinations:

- a. Impair the Usefulness of the Project Determination. The objective of this determination is to ensure that the proposed alteration will not limit the

ability of the project to function as authorized and will not compromise or change any authorized project conditions, purposes or outputs.

- b. Injurious to the Public Interest Determination. Proposed alterations will be reviewed to determine the probable impacts, including cumulative impacts, on the public interest. The decision whether to approve an alteration will be determined by the consideration of whether benefits are commensurate with risks.
- c. Legal and Policy Compliance Determination. A determination will be made as to whether the proposed alteration meets all legal and policy requirements.
- d. Verify Appropriate Decision Level. Verify whether or not HQUSACE review and decision is required. Based on the level of complexity and the risk associated with the modification, the District Levee Safety Officer has determined that HQUSACE is the appropriate decision level.

b. Requirements

The review of this alteration request shall include a District-led Agency Technical Review (ATR), reference paragraph 7.c.(4) in EC 1165-2-216. The review of all work products will be in accordance with the guidelines established within this review plan.

Agency Technical Review (ATR) is required to "ensure the quality and credibility of the government's scientific information" in accordance with EC 1165-2-214, and the Quality Management of NAD. The management of ATR review will be conducted by NAP and review will be concurrent with NAP and the RMC. The RMC ATR team will be assigned by the RMC and comprised of senior USACE personnel, preferably recognized subject matter experts with the appropriate technical expertise such as regional technical specialists (RTS), and may be supplemented by outside experts as appropriate. The RMC will issue a charge to reviewers to structure and guide the ATR team.

The Fahy Bridge Rehabilitation requires several fields of expertise for ATR review activities. These fields include geotechnical engineering, geology, and hydraulic engineering. Consistency checks between all engineering concerns/documents will be included in all reviews by the ATR and will be a responsibility of the review members. The ATR will also examine relevant RQC records and provide written comment on the adequacy of the RQC effort. During project development, seamless review by the ATR team is encouraged for all aspects of the project. The PDT members will initiate seamless reviews at appropriate times in order to reach a common understanding with their ATR counterparts, thereby minimizing significant comments/impacts during final ATR.

ATR will be managed by NAP and include District Personnel as well as a qualified team from outside NAP that is not involved in the day-to-day production of the project/product as assigned by the RMC. There will be appropriate consultation throughout the review with the allied Communities of Practice (CoPs), other relevant CXs, and other relevant offices to ensure that a review team with appropriate expertise is assembled and a cohesive and comprehensive review is accomplished. The RMC, North Atlantic Division, PDT, and Dam Safety Modification Mandatory Center of Expertise (DSMMCX) located in the Huntington District will be utilized as necessary during the review process.

ATR efforts will include the necessary expertise to address compliance with applicable published policy. When policy and/or legal concerns arise during ATR efforts that are not readily and mutually resolved by the PDT, and the reviewers, the district will seek issue resolution support from NAD, RMC, DSMMCX and HQUSACE in accordance with the procedures outlined in ER 1105-2-100, or other appropriate guidance.

ATR will be certified when all ATR comments are either resolved or referred to RMC for resolution and the ATR documentation is complete. Attachment 4 details the NAP ATR Team.

c. Documentation of ATR

DrChecks review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process. Comments will be limited to those that are required to ensure adequacy of the product. The four key parts of a quality review comment will normally include:

- (1) The review concern – identify the product’s information deficiency or incorrect application of policy, guidance, or procedures;
- (2) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not been properly followed;
- (3) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and
- (4) The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

d. Comment Resolution

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist. The ATR documentation in DrChecks includes the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any

vertical team coordination (the vertical team includes the district, RMO, MSC, and HQUSACE), and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the PDT, it will be elevated to the vertical team for further resolution in accordance with the policy issue resolution process described in either ER 1110-1-12 or ER 1105-2-100, Appendix H, as appropriate. Unresolved concerns can be closed in DrChecks with a notation that the concern has been elevated to the vertical team for resolution.

e. Products to Undergo ATR

Products to be reviewed include at a minimum, 60% plans and specifications and any other relevant design information provided by HNTB. Satisfactory information must be submitted to determine that the proposed modification does not impair the usefulness of the project or be harmful to the public interest.

f. Required ATR Team Expertise and Requirements

ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The RMC will provide a list of personnel required to complete the RMC ATR Review.

The following provides an estimate of the disciplines and experience required for the ATR of the Fahy Bridge Rehabilitation. The ATR team will be chosen based on each individual's qualifications and experience with similar projects.

ATR Lead - The ATR lead is a senior professional with extensive experience in preparing Civil Works documents and conducting ATRs. The lead has the necessary skills and experience to lead a virtual team through the ATR process.

Geotechnical Engineer - shall have experience in the field of geotechnical engineering, analysis, design, and construction of levee. The geotechnical engineer shall have experience in subsurface investigations, rock and soil mechanics, internal erosion (seepage and piping), slope stability evaluations, erosion protection design, caisson design, and earthwork construction.

Engineering Geologist - shall have experience in assessing internal erosion (seepage and piping) beneath levees. The engineering geologist shall be familiar with identification of geological hazards, exploration techniques, field and laboratory testing erosion protection design, caisson design, and earthwork construction.

g. Completion and Certification of the ATR

At the conclusion of each ATR effort, the ATR team will prepare a Review Report summarizing the review. Review Reports will be considered an integral part of the ATR documentation and shall:

- (1) Identify the document(s) reviewed and the purpose of the review;
- (2) Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- (3) Include the charge to the reviewers;
- (4) Describe the nature of their review and their findings and conclusions;
- (5) Identify and summarize each unresolved issue (if any); and
- (6) Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

ATR may be certified when all ATR concerns are either resolved or referred to the vertical team for resolution and the ATR documentation is complete. The ATR lead will prepare a completion of ATR and Certification of ATR. It will certify that the issues raised by the ATR team have been resolved (or elevated to the vertical team). The completion and certification should be completed based on the work reviewed to date for the project.

h. Policy and Legal Compliance Review

All implementation documents will be reviewed throughout the project for their compliance with law and policy. These reviews culminate in determinations that the recommendations in the reports and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. DQC and ATR augment and complement the policy review processes by addressing compliance with pertinent published Army policies.

i. Division Certification

Once the ATR is completed, the project findings will be submitted to NAD for approval. Upon receipt of the district prepared Summary of Findings for MSC review and decision, the division will review the submittal and provide comments to the district within 30 days unless the division notifies the district that additional review time is needed. The division will review the Summary of Findings for policy compliance and legal sufficiency; quality assurance and completeness; identification of conflicts with ongoing studies. The district is responsible for addressing Division comments prior to submission to HQUSACE. The timeline required to address comments may vary depending on significance of the division comments. If the division decides the district may approve

the Section 408, that rationale should be documented as part of the administrative record.

The Division Commander will either deny the Section 408 request or recommend approval. If the division denies the request, this decision will be transmitted to the district.

j. HQUSACE Certification

Upon receipt of the Section 408 submittal from the division, the RIT will forward the Summary of Findings and division recommendation to the HQUSACE Office of Water Project Review (CECW-PC) for a policy compliance review. The RIT will ensure that the appropriate reviewers include engineering and other appropriate subject matter experts such as navigation, levee safety, dam safety, real estate and environmental. HQUSACE will review and provide comments within 30 days, unless HQUSACE notifies the division that additional review time is needed. The timeline required to address comments will vary depending on significance of the HQUSACE comments. The RIT will coordinate the results, as needed, to correct or improve the package as necessary to address concerns. The district is responsible for addressing HQUSACE comments or coordinating with the requester for comment resolution.

6. Independent External Peer Review (IEPR)/Safety Assurance Review (SAR)

b. Decision on Type II IEPR

A Type II IEPR will be performed during the Implementation Phase on the design and construction activities associated with the following features: plans, supporting data, and analyses. A risk-informed decision was made as to whether IEPR is appropriate based on the factors to consider for conducting a Type II IEPR review that are outlined in EC 1165-2-214, Appendix E, Section 2 (a) thru (c).

A risk informed decision was made that this project could potentially pose significant threat to human life (public safety). Attachment 3 provides a supporting risk analysis of the decision.

a. Required SAR Panel Expertise

The following provides an estimate of the SAR panel members and the types of expertise that should be represented on the review panel. All panel members shall be "distinguished experts in engineering, hydrology, or other appropriate disciplines.", WRDA 2007. Panel members should have an advanced degree and be professionally registered.



Geotechnical Engineer - The panel member should be a senior-level geotechnical engineer with experience in the field of geotechnical engineering, analysis, design, and construction of levees. The Panel Member should have knowledge and experience in the forensic investigation and evaluation of seepage and piping, settlement, slope stability, and deformations problems associated with embankments constructed on weathered and jointed rock and alluvial soils. The Panel Member should have experience in caisson construction and design as well as erosion protection and design. The Panel Member should have experience in failure mode analysis, risk assessment and evaluating risk reduction measures for levee safety assurance projects.

Engineering Geologist - The Engineering Geologist panel member should be a senior-level geologist familiar with identification of geological hazards, exploration techniques, field and laboratory testing. The Panel Member should be proficient in assessing slope stability, seepage and piping through and beneath levees within various geologic environments, including but not limited to alluvial (including open-work gravels) and colluvial (including boulders and cobbles) materials. The Panel Member should have experience in caisson construction and design as well as erosion protection and design. The Panel Member should have experience in failure mode analysis, risk assessment and evaluating risk reduction measures for levee safety assurance projects

Hydraulic Engineer – The Panel Member should have experience with engineering analysis related to flood risk management and levee safety projects. The Panel member will hold a degree in Civil Engineering, or Hydrology and Hydraulics Engineering. The Panel Member should have experience with erosion modeling. The Panel Member should have experience in caisson construction and design as well as erosion protection and design. The Panel Member should have experience in failure mode analysis, risk assessment and evaluating risk reduction measures for levee safety assurance projects

Structural Engineer – shall have experience and be proficient in performing stability analysis, finite element analysis, seismic time history studies, and external stability analysis including for bridge design. The Panel Member should have experience in caisson construction and design. The Panel Member should have experience in failure mode analysis, risk assessment and evaluating risk reduction measures for levee safety assurance projects

Construction Engineer – Reviewer should be a senior level, professionally registered engineer with extensive experience in the engineering construction field with experience in bridge construction and levee safety. The Construction reviewer should have a minimum of 15 years of experience.

b. Completion and Certification of the IEPR

The SAR will be managed by an AE firm which meets the criteria set forth in EC 1165-2-214. DrChecks review software may be used to document the SAR comments and aid in the preparation of the Review Report but is not required.

Comments should address the adequacy and acceptability of the engineering, models, and analyses used. SAR comments should generally include the same four key parts as described for ATR comments in Section 4.

No later than 60 days following each milestone, the SAR panel will prepare a Review Report that will accompany the publication of the final report for the project and shall:

Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;

- (1) Include the charge to the reviewers;
- (2) Describe the nature of their review and their findings and conclusions; and
- (3) Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

This review report, including reviewer comments and a recommendation letter will be provided to the RMC as soon as they become available. A suggested report outline is an introduction, the composition of the review team, a summary of the review during design, a summary of the review during construction, any lessons learned in both the process and/or design and construction, and appendices for conflict of disclosure forms, for comments to include any appendices for supporting analyses and assessments of the adequacy and acceptability of the methods, models, and analyses used. All comments in the report will be finalized by the panel prior to their release to USACE for each review plan milestone. Written responses to the IEPR Review Report will be prepared to explain the agreement or disagreement with the views expressed in the

report, the actions undertaken or to be undertaken in response to the report, and the reasons those actions are believed to satisfy the key concerns stated in the report (if applicable). These comment responses will be provided to the RMC for concurrence. The requestor will prepare responses except that issue resolution will be a dual responsibility between the product provider and USACE, with USACE having the final authority. The revised submittal will be provided to the RMO with the USACE response and all other materials related to the review. After the MSC Commander's approval, the District will make the report and responses available to the public on the District's website.

5. Review Schedule and Costs

a. Schedule of Reviews

PROJECT PHASE/SUBMITTAL	REVIEW START DATE	REVIEW END DATE
RQC Review 60%	TBD	TBD
NAP ATR Review	TBD	TBD
RMC ATR Review	Concurrent with NAP ATR	Concurrent with NAP ATR
NAD Certification	30 Days after ATR	
HQUSACE Certification	30 days after NAD Certification	

b. ATR and SAR Cost

The preliminary review schedule is listed in the provided in the table in paragraph a of this section.

ATR

The cost for the ATR is approximately \$30,000.

SAR

A SAR will be required for this project. Initial indications are that the estimated cost for the SAR is in the range of \$30, 00 to \$50,000. This estimate will be refined when the Scope of Work for the SAR contract is completed. The SAR contractor will be involved with the project through the construction phase. More specific milestone dates will be added in the future during the construction phase, but it can be assumed to occur near the mid-point of construction and at project completion.

6. Public Participation of Review Plan

As required by EC 1165-2-214, the approved Review Plan will be posted on the District public website:

<http://www.nap.usace.army.mil/Missions/CivilWorksReviewPlans.aspx> .

This is not a formal comment period and there is no set timeframe for the opportunity for public comment. If and when comments are received, the PDT will consider them and decide if revisions to the review plan are necessary. This engagement will ensure that the peer review approach is responsive to the wide array of stakeholders and customers, both within and outside the federal government.

7. Review Plan Approval and Updates

The MSC for this is the North Atlantic Division. The MSC Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (involving the Philadelphia District, MSC, and RMC) as to the appropriate scope and level of review for the study and endorsement by the RMC. The Review Plan is a living document and may change as the study progresses, the district is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval will be documented in an Attachment to this plan.

Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-endorsed by the RMC and re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the Review Plan, along with the Commanders' approval memorandum, will be posted on the District's webpage. The latest Review Plan should also be provided to the RMO and home MSC.

8. Review Plan Points of Contact

NAME/TITLE	ORGANIZATION	EMAIL/PHONE
Robert Phillips, Section 408 Coordinator	CENAP-EC-EG	robert.w.phillips@usace.army.mil 215-656-6682
John Clarkson, Senior Reviewer	CEIWR-RMC	john.d.clarkson@usace.army.mil 304-399-5217

ATTACHMENT 5: COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the Fahy Bridge Rehabilitation in the Bethlehem Levee Project in Bethlehem, PA. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-214 and EC 1165-2-216. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the Requestor Quality Control (RQC) documentation and made the determination that the RQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrCheckssm.

SIGNATURE

Daniel Kelly, P.E.
ATR Team Leader
CENAP-EC-EG

Date

SIGNATURE

Robert Phillips, P.E.
Section 408 Coordinator
CENAP-EC-EG

Date

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows: *Describe the major technical concerns and their resolution.* As noted above, all concerns resulting from the ATR of the project have been fully resolved.

SIGNATURE

Peter Tranchik, P.E.
Chief, Engineering and Construction Division
Levee Safety Officer
CENAP-EC

Date



US Army Corps
of Engineers

Philadelphia District

ATTACHMENT 6: SAR Plan from Requestor

ATTACHMENT 7: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number